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(19) **United States**(12) **Patent Application Publication**
Topliss et al.(10) **Pub. No.: US 2022/0155588 A1**(43) **Pub. Date: May 19, 2022**(54) **VIRTUAL REALITY SYSTEM**(71) Applicant: **Apple Inc.**, Cupertino, CA (US)(72) Inventors: **Richard J. Topliss**, Campbell, CA (US); **Alexander Shpunt**, Portola Valley, CA (US)(73) Assignee: **Apple Inc.**, Cupertino, CA (US)(21) Appl. No.: **17/665,241**(22) Filed: **Feb. 4, 2022****Related U.S. Application Data**

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G02B 27/01 (2006.01)(52) **U.S. Cl.**CPC **G02B 27/0093** (2013.01); **H04N 13/324** (2018.05); **G02B 2027/0123** (2013.01); **G02B 27/0172** (2013.01)(57) **ABSTRACT**

Methods and systems for a virtual and/or augmented reality device may include a light emitting device that includes one or more light emitting elements configured to generate collimated light beams. A scanning mirror may include one or more microelectromechanical systems (MEMS) mirrors. Each MEMS mirror of the scanning mirror may be configured to dynamically tilt in at least one of two orthogonal degrees of freedom to raster scan the light beams over multiple angles corresponding to a field of view of an image. A curved mirror may include curves in two orthogonal directions configured to reflect the collimated light beams from the scanning mirror into a subject's eye in proximity to the curved mirror to form a virtual image. The curved mirror may allow external light to pass through, thus allowing the virtual image to be combined with a real image to provide an augmented reality.

